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# Students' Perceptions of Receiving Digital Transformation Training Regarding Digital Learning Environments

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***Abstract*** **– In order to experience digital transformation in high schools, it is very important to know the perceptions, attitudes and opinions of students. This research aims to ascertain high school students' impressions of digital learning environments following digital transformation training. The relational survey paradigm used in the quantitative research was used to create the study. 328 high students that were enrolled in classes made up the research's sample group. The students participating in the study were almost equally distributed in terms of gender and grade. Following the three weeks of the researchers' digital transformation training, the scale was used to collect study data from the students. The researchers also created the online model scale. There were 20 items on the two-factor "students' perceptions of digital learning environments scale." The t-test for two independent variables and the one-way ANOVA for more than two independent variables were used in addition to descriptive statistics.**

**The study's findings indicate that students perceive their level of skill in digital transformation to be high in the digital learning environments, very high in the digital adaption sub-dimension, and high in the digital satisfaction sub-dimension. Regarding the gender variable, there was no discernible variation in the digital transformation competencies of the research participants. Nevertheless, the class variable they examined revealed a substantial difference. Students in the tenth grade were found to benefit from the large difference.**

***Keywords*** **– Online course, digital transformation, student perception.**

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## 1. Introduction

Digital transformation training in higher education encompasses the integration of digital technologies and pedagogical practices that aim to improve the learning experience. As institutions increasingly adopt digital tools, the meaning of this training is pronounced in the formation of students' perceptions and experiences in learning environments. Student opinions on digital transformation in education are fundamental, mainly because these perspectives can influence their engagement and academic success. In contemporary contexts, where technology is omnipresent, the relevance of digital transformation is amplified. Research suggests that when implemented effectively, digital transformation initiatives can substantially increase student involvement levels [1], which highlight the correlation between effective digital strategies and greater student participation in learning activities. This change requires an examination of how students perceive the resources and digital structures that are being introduced into their academic environments.

The integration of digital learning environments in high school has significantly transformed the scenario of teaching and learning, presenting opportunities and challenges regarding student involvement, academic performance, and social interactions [2]. As educational institutions increasingly adopt technology, it is essential to understand their implications for high school students.

Research has shown that digital learning environments positively influence student involvement, especially in combined learning environments. As illustrated by [3] that combined learning environments improve students' academic performance and engagement, especially in social study courses. This combination of face-to-face interaction and online resources promotes a more dynamic learning experience, allowing students to actively participate in their education. In addition, [4] explores the relationship between virtual learning environments and student involvement, finding a significant correlation with academic performance. Their findings suggest that when students use digital tools effectively, it is more likely to get deep into the material and improve their academic results.

In addition, the role of digital readiness is vital to understanding academic success in e-learning contexts. Emphasized by [5] that students' academic involvement and their readiness to adapt to digital tools significantly affect their achievements in higher education's online configurations. This notion can be extrapolated to high school students, highlighting the importance of equipping them with the skills needed to effectively navigate digital learning environments. Involving students from an early age in technology-enhanced learning can ensure that they develop essential skills for academic success [6].

Interestingly, the influence of rural environments on digital learning environments invites a deeper exam. In his study, [7] examines the challenges faced by rural teachers in the implementation of a digital learning environment and how these challenges affect student involvement and subject learning results. The study indicates that, despite infrastructure limitations, innovative teaching practices can still facilitate student involvement, highlighting the need for adaptive pedagogies that meet various learning contexts.

Social interactions are also notably affected by digital learning practices. Digital Arena offers exclusive platforms for student collaboration, but can also lead to disconnect if not properly managed. As argued by [8], digital learning tools significantly improve students' involvement in high school science classes, suggesting that collaborative digital activities can promote positive social interactions among colleagues.

However, the risk of diminished face-to-face interaction remains a critical concern for educators; The balance between digital involvement and traditional social interactions should be carefully considered.

In addition, the impact of digital learning environments on self-regulation skills cannot be neglected. Students who engage in these environments usually show a sense of responsibility for their learning [9]. As highlighted by [10], increased autonomy in learning leads to greater motivation and engagement, fundamental components for academic success. However, the need for guided instructions remains, especially for students who struggle to self-regulate.

With the advent of various digital learning platforms, the benefits associated with digital transformation training are multiple. A significant advantage is improved access to educational resources. As [4] observe, digital transformation facilitates a multitude of features that are readily available to students, allowing them to get involved with content beyond the traditional limits of the classroom. This accessibility is crucial to offering equitable educational opportunities, especially for those who can face barriers in traditional environments. In addition, the flexibility offered by Digital Learning continues allows students to adapt their learning experiences to fit their individual hours and learning steps, thus promoting a more personalized education. As noted by [11], this review is not only accompanied by an expansion of the student's autonomy but also by a more detailed involvement in the course content.

In addition to improved access and flexibility, digital transformation training significantly affects students' digital skills. As students sail digital tools and learning platforms, they develop essential skills that are increasingly required in modern workforce. As stated by [12] that greater proficiency in digital skills among students enhances their general academic performance and prepares them best for future employment prospects. This aspect of digital transformation goes beyond the mere acquisition of knowledge. It equips the students with the skills needed to thrive in a technologically oriented landscape. However, it is crucial to recognize that the implementation of such training is not free of challenges. Students usually face obstacles, such as varied levels of technological proficiency, which can create disparities in learning experiences.

Understanding students' perceptions of digital transformation training is essential to assess the overall effectiveness of digital learning initiatives.

By analyzing critically how students perceive these changes, educators and institutions can better adapt their approaches to maximizing the results of engagement and learning. As digital transformation continues to permeate higher education, promoting a digital and inclusive digital environment will be critical to ensuring that all students can benefit from technology advances. Continuous research efforts in this area will contribute to establishing best practices that improve the digital learning scenario, enriching students' experiences and results in increasingly digitized educational contexts [13]. The challenges that students face during digital transformation training are multifaceted and justify an exhaustive exam. The main problem, as highlighted by [14], relates to inequalities in digital readiness and access to basic technology, which can lead to inequalities in student participation and engagement.

While some students may have advanced technological skills and access to high quality devices and reliable Internet connections, others may have difficulties with inappropriate resources, which hinders their ability to completely compromise with digital learning environments. This inequality can lead to a fragmented learning experience, since students who are less technologically experienced can find increasingly difficult to maintain the rhythm of their classmates, leading to frustrations and decreased motivation.

In addition, the change to digital learning environments has resulted in a remarkable lack of face-to-face interaction, which has been related to feelings of isolation among students [15]. The absence of communication in person not only limits the opportunities for collaboration and support between peers, but also affects the general emotional well-being of the students. The lack of social presence may decrease the meaning of the community that encourage traditional class environments, which can lead to disconnection levels and lower levels of satisfaction. The research indicates that students often obtain motivation and a sense of belonging to interpersonal relationships with instructors and colleagues; Therefore, the disconnection experienced in online environments can contribute to the negative perceptions of their educational experiences.

Technical difficulties further complicate the digital transformation training panorama. Problems such as software failures, connectivity problems, and inappropriate user support can hinder the learning experience [14]. These technical obstacles can not only interrupt the learning flow, but they can also encourage a feeling of frustration and impotence among students, which can negatively affect their commitment.

The perception of online learning as challenging can be exacerbated for those students who find frequent technological barriers, since these experiences can lead them to question the effectiveness of the learning platform and their ability to succeed in an increasingly digital world [11]. Consequently, students' perceptions about the difficulties associated with online learning can significantly form their general satisfaction and their willingness to actively participate in digital learning environments.

Although digital transformation has substantial advantages, such as flexibility and convenience, it is crucial to address these challenges to promote a coherent and support learning experience [16]. The effective implementation of digital transformation training must imply the identification of barriers related to digital equity and isolation, accompanied by specific strategies to mitigate these obstacles. Recognizing students' limitations and perceptions in digital learning contexts is essential for interested parties that aim to improve commitment and satisfaction in various student populations. In the future, it is imperative that educational institutions guarantee that the benefits of digital transformation do not reach the expense of students' experiences and general educational results. The effectiveness of training programs in digital transformation is increasingly recognized for their role in improving students' commitment and influence on academic results. Research indicates that students participating in these training initiatives say they feel more competent and confident when using digital learning platforms. For example, [17] found that participants in digital transformation programs have shown a marked improvement in their ability to navigate online educational tools, which has led to higher levels of academic success and satisfaction. Likewise, [18] stressed that such training not only gives students essential digital skills, but also promotes a more active approach to learning, in which students are more deeply involved with course equipment and collaborate effectively with peers in digital contexts.

The relationship between training in digital transformation and the commitment of students is also underlined by the impact of tailor-made support structures, which are designed on the basis of students' comments and contributions. Continuous feedback mechanisms, as suggested in [14], are essential to refine training programs to improve their relevance and efficiency. By actively involving students in the iterative process of programs development, establishments can ensure that the training provided meets the evolutionary needs of learners.

For example, [19] corroborated this observation by stressing that real-time comments help not only to adjust the content of the training but also to strengthen the sense of belonging of students in their learning processes, thus increasing their global commitment.

In addition, although the potential advantages of training in digital transformation are substantial, it is essential to recognize the challenges associated with implementation. Some students, particularly those who have previous limited experience in digital environments, may find these overwhelming transitions, leading to frustration and disengagement [19]. Effective training must therefore address these disparities in digital literacy among students to create fair learning opportunities. As reinforced by [20], this perspective indicates that institutions are responsible for balancing the supply of complete training programs while considering the various horizons and the levels of preparation for their student populations

The increasing use of digital learning environments involves a comprehensive understanding of their experiences in order to promote the mismatches that may arise from false expectations. The general academic characteristics of a student are damaged by the Factors such as technical difficulties, insufficient prompt feedback, and social isolation compromise a student's overall academic attributes.

Therefore, it is imperative to address these issues on a research basis with specific techniques such as efforts to strengthen peer presentation and real-time technical support in order to sustain their passion and development within digital frameworks.

As a result, more complex and successful strategies are being combined by acknowledging and addressing the many perspectives in digital learning environments in educational institutions. Teachers can build digital spaces that include not only money, but also their input, actively structured and learning different tactics, increasing their adaptation and happiness. In this regard, research data on this topic is needed. Especially after students receive digital transformation training on digital learning environments, the resulting data is important, but also a research need.

The purpose of this research is to determine the perceptions of students receiving digital transformation training regarding digital learning environments.

## 2. Method and Materials

This section contains information about the research method, the participants of the research, and the data collection tools developed by the method. Additionally, the ethical process of the research was detailed. The method used to evaluate the data is also included in this section.

### *2.1. Research Method*

The research was designed in the relational survey model within the scope of quantitative research. Relational scanning aims to describe a situation that exists now or has occurred in the past and to determine the relationship between variables related to that situation. In this method, the relationship between the variables and the event or situation determined as the subject of research is determined, and the size of the relationship is revealed [21]. Based on this model, aims to determine the digital transformation of students in education with the online course model and to reveal the relationship between the determined digital transformation and the gender of the students and the class variable in which they study.

### *2.2. Participants*

The sample group of the research consists of 328 students studying in various schools in Almaty, Kazakhstan. Students are studying in the 2022-2023 academic year. Demographic information of the sample group of the research is given in Table 1.

*Table 1. Demographic characteristics of students*

| Gender | f | % |
|---|---|---|
| Female | 170 | 51.8 |
| Male | 158 | 48.2 |
| Total | 328 | 100 |
| **Class** | **f** | **%** |
| 8th grade | 106 | 32.3 |
| 9th grade | 97 | 29.6 |
| 10th grade | 125 | 38.1 |
| Total | 328 | 100 |

Table 1 shows the gender and class distribution of the students. 51.8% of the students are female and 48.2% are male. 32.3% of the students participating in the research study were in the 8th grade, 29.6% in the 9th grade, and 38.1% in the 10th grade. A total of 328 students participated in the research.

### *2.3. Data Collection Tools*

Research data were collected with the "Perceptions of Digital Learning Environments Scale". The online model scale was developed by the researchers. The digital transformation training given to the students online was also planned by the researchers.

#### *2.3.1. Students' Perceptions of Digital Learning Environments Scale*

The researchers took several actions in order to construct the scale. The formation of the item pool is the first of these. The researchers developed 39 items for the scale after reviewing the literature on the topic in the field.

Five experts were consulted in order to assess the items in the item pool's appropriateness for the study's subject matter. The items were assessed by experts. The experts selected the items they believed were appropriate for the study's subject matter from the 39 items in the item pool. The elements from the item pool that were approved by five experts were used to generate the draft scale. The draft scale consisted of 24 components. The sample group to which the application would be submitted was established following this phase. Students in the eighth, ninth, and tenth grade made up the sample group. This portion of the study involved 269 students. There were 159 male pupils and 110 female students. Students who took part in this study were not included in the study's sample group. The scale's application form was made using a 5-point Likert scale. Students' levels of agreement with the items were ranked as follows: 1 for "Strongly disagree," 2 for "disagree," 3 for "partially agree," 4 for "agree," and 5 for "strongly agree." The scale's construct validity was assessed following application. Initially, the Barlett Sphericity test and the Kaiser-Meyer-Olkin (KMO) coefficient were examined. KMO 0.84 and Barlett Sphericity test $\chi 2=4341.53$, $p=.00$; factor analysis was done on the data set because it was found that $p<.05$. Both confirmatory and exploratory factor analyses (EFA and CFA) were conducted.

For EFA, SPSS 25.0 was utilized, and for CFA, the SPSS Amos program. First, the factor structure for EFA was attempted to be ascertained. The Varimax orthogonal rotation technique and rotated principal components analysis were employed for this. At this point, the relevant criteria were considered. The first of these requirements was that each factor's eigenvalue would be at least 1. It should also be 0.40 or greater. The difference between the two load values should be at least 0.10 if an item had a high load value in more than one factor. Integrity in terms of meaning and substance should also be pursued. Following Varimax rotation, it was observed that the requirements were satisfied. Four items were eliminated from the scale because they did not fit the requirements. The scale application form, which had 20 elements, was used to repeat the analyses. Twenty elements were found to be categorized into two variables as a consequence of the research. Digital adaption was the first component, and digital satisfaction was the second. The first component had eleven items, while the second factor has nine. On the scale, every item is positive. Following this phase, CFA was carried out. The scale's goodness of fit index was examined during the CFA stage. Table 2 provided the scale's goodness of fit index as well as the good and acceptable goodness of fit index.

*Table 2. The goodness of fit index*

| Degree of Compatibility | x2/ df | GFI | AGFI | CFI | RMSEA |
|---|---|---|---|---|---|
| Scale | 2.03 | 0.91 | 0.97 | 0.96 | 0.03 |
| Good Fit | ≤3 | ≥0.90 | ≥ 0.90 | ≥0.97 | ≤0.05 |
| Acceptable Fit | ≤4-5 | 0.89-0.85 | 0.89-0.80 | ≥0.95 | 0.06-0.08 |

*Goodness-of-Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI)*
*Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSA)*

The scale's goodness of fit index is displayed in Table 2. Furthermore, the degrees of good fit and acceptable fit were compared with the quality of fit indices of the scale [20]. According to the acquired results, the CFI value indicates an adequate fit, whereas the X2 / df, GFI, AGFI, and RMSA values indicate a good fit. This data demonstrates the validity of the structure derived by factor analysis.

The scale's factor structures were confirmed, and a reliability analysis was conducted. The Cronbach's alpha coefficient was computed independently for the overall scale and the sub-dimensions. For the sub-dimension of digital adaptation, the Cronbach alpha score was 0.83, and for the sub-dimension of digital satisfaction, it was 0.89. The total scale's internal consistency coefficient was determined to be 0.85. The scale's relevant reliability is demonstrated by the values obtained. The item score interval used was a five-point Likert scale.

Accordingly, significantly disagree is defined as 1.00-1.80, disagree as 1.81-2.60, partially agree as 2.61-3.40, agree as 3.41-4.20, and strongly agree as 4.21-5.00. Students' proficiency with digital transformation increases as their answers get closer to 5 and decreases as they get closer to 1.

#### *2.3.2. Digital Transformation Training*

The digital transformation training designed for students has been created to be online. The training lasted 3 weeks. The educational process has been planned to suit the students. Accordingly, students were divided into small groups. Students divided into classes of 41 students were given 4 hours of education per week. In the digital transformation training designed for students, content containing nine elements of [21] digital citizenship concept was created. Weekly goals and achievements of the training provided are given below.

Week 1: Digital access, digital law, digital courtesy.

Week 2: Digital communication, digital literacy, digital commerce.

Week 3: Digital rights and responsibilities, digital health and well-being, digital security.

During the education process, regular participation of the students in the program was ensured. Students fully participated in the 12-hour training program. At the end of the program, it was aimed that the students have a level of digital citizenship knowledge that will educate themselves and others in a way that will protect themselves and others, within the framework of respect for themselves and others, and digital transformation competence has been tried to be created.

### *2.4. Data Collection Process*

Digital transformation training was provided to the students participating in the research on the learning platform. Following the 3-week training, the online model scale developed by the researchers was applied online to the students participating in the training. The application time of the Perceptions of Digital Learning Environments Scale was determined as approximately 10-12 minutes. The process of collecting data from all students took approximately 5 weeks, including digital transformation training.

### *2.5. Compliance with Ethics*

Interviews were conducted with the school administrators of the students participating in the study. By explaining the research process and purpose, permission was obtained to carry out the studies. Then, the parents of the students were reached, the ethical dimension, process, and purpose of the research were explained, and the parental consent document was signed. Finally, after the permissions were obtained from the school administrators and parents, the students who voluntarily accepted to participate in the research and were suitable in time were determined, and the sample group of the research was formed. At every stage of the research, it was acted by the principles of research ethics.

### *2.6. Data Analysis*

Analysis of the quantitative data of the research was carried out with the SPSS 25.0 statistical program. Weighted mean and standard deviation were calculated. Kolmogorov-Smirnov test was applied to evaluate normal distribution, and p values obtained from the test are It revealed that the data set showed normal distribution ($p<0.05$).

Parametric statistical methods were applied according to the test results.

In addition to descriptive statistics, T-test for two different independent variables and one-way ANOVA for more than two independent variables were applied.

## 3. Results

In this section, the data obtained from the Perceptions of Digital Learning Environments Scale applied to the students after the digital transformation training was evaluated.

Table 3 gives the weighted averages and standard deviations for the online model scale sub-dimensions, digital adaptation, digital satisfaction, and the overall scale.

*Table 3. Online model scale weighted means and standard deviations*

| | ***M*** | **SS** |
|---|---|---|
| **Digital adaptation** | 3.75 | 0.693 |
| **Digital satisfaction** | 4.29 | 0.771 |
| **Total Scale** | 4.01 | 0.795 |

Table 3 shows digital adaptation sub-dimension ($M=3.75$, $SD=0.693$), digital satisfaction sub-dimension ($M=4.29$, $SD=0.771$) and online model scale ($M=4.01$, $SD=0.795$). Weighted mean and standard deviations were calculated. This calculation reveals that the students participating in the research have high digital transformation proficiency in the digital satisfaction sub-dimension, very high, digital adaptation sub-dimension, and overall online model scale.

In Table 4, the results of the independent variables T-test according to the gender variable of the students participating in the research are given.

*Table 4. Independent variables t-test results*

| **Gender** | **N** | ***M*** | **SD** | **F** | **p** |
|---|---|---|---|---|---|
| **female** | 170 | 3.93 | 0.671 | 4,952 | ,211 |
| **Male** | 158 | 4.08 | 0.814 | | |

The gender variable was utilized to assess the digital transformation competencies of the research participants, as shown in Table 4. The gender variable did not significantly affect the students' digital transformation competencies, according to the test results ($F=4.752$, $p>.0.5$).

Table 5 presents the findings of a one-way analysis of variance (ANOVA) based on the professional seniority variable of the research participants.

*Table 5. One-way analysis of variance ANOVA results*

| Class | N | *M* | SD | F | p |
|---|---|---|---|---|---|
| 8th grade | 106 | 3.63 | 0.610 | 12,109 | ,000 |
| 9th grade | 97 | 3.75 | 0.804 | | |
| 10th grade | 125 | 4.66 | 0.865 | | |

Table 5 shows the evaluation of the research participants' digital transformation competencies based on the class variable. The students' class variable revealed a significant difference in digital transformation competencies ($F=12.109$, $p<0.5$) based on the results of a one-way analysis of variance (ANOVA). It was concluded that the 10th grade benefited from the large difference.

## 4. Discussion

This section discusses the findings of research in the subject as well as the data from the "Perceptions of Digital Learning Environments Scale," which was administered to students following training in digital transformation. According to this study, pupils demonstrated very high levels of digital transformation skill in both the digital adaption sub-dimension and the scale, as well as in the digital happiness sub-dimension. Students' attitudes about distant education were shown to be negative in [22] study, which looked at undergraduate students' attitudes toward switching to an online learning environment. In their study of university students who continue to attend higher education institutions after switching to distant learning because of the worldwide pandemic, [23] discovered that students' attitudes and perspectives regarding distance education are not favorable. Furthermore, the study found that students' enjoyment of the lectures and their sense of self-efficacy were the most significant factors influencing their attitude. It was discovered that the participants' online education competences were moderate in the study by [24], which examined the attitudes and competencies of academics, teachers, and students regarding online education.

According to the gender variable, there was no discernible difference in the students' digital transformation competencies in this study. When [25] measured secondary school pupils' awareness of digital change, they discovered that gender did not significantly affect the results. In the study [26], the connections between the sub-dimensions of online inequality and its effects were investigated, and it was discovered that women have lower levels of technology self-efficacy than men.

In their study to ascertain students' preference levels and challenges with remote learning, [27] discovered that attitudes toward distance learning were not influenced by gender. In their attempt to find a model for explaining instructors' acceptance of e-learning technology, [28] discovered that gender did not significantly affect the results.

The results of this study showed that students' digital transformation competencies varied significantly based on their class, with the 10th graders showing the largest variance. The integration of interdisciplinary approaches and digital learning environments is crucial for supporting academic and personal development in teacher education programs, as emphasized in [29]. For example, [30] conducted a study with 139 pre-service instructors to investigate their attitudes about computer use and discovered that age and gender did not significantly affect students' views toward computers. Furthermore, [13] discovered that students had positive opinions about online education.

## 5. Conclusion

Digital chances are expanding constantly in contemporary society, and children born in this era are considered digital citizens.

In this day and age, it is impossible for educators and learners to be without access to digital learning resources and to be competent in using them. Because of this, the researchers' online model scale was used in this study to try and ascertain the students' digital transformation competences in support of the digital transformation education they had established.

The study's findings indicate that students' proficiency in digital transformation is high in the online model scale, very high in the digital adaption sub-dimension, and high in the digital happiness sub-dimension. Regarding the gender variable, there was no discernible variation in the digital transformation competencies of the research participants; nevertheless, the class variable they examined revealed a substantial difference. Students in the tenth grade were found to benefit from the large difference.

According to the research findings, students' digital transformation competencies are positively impacted when they receive training in this area. At all educational levels, it is crucial to offer training to improve students' digital transformation skills because of this. Additionally, it is necessary to establish the digital transformation competencies of educators at all educational levels. Particularly, teacher training programs should be used to impart these competencies, and ongoing in-service training programs should be used to sustain them. All parties involved in education and training are expected to participate in this study, which is expected to advance the field.

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